NEWS RELEASE

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NASA TO TEST APOLLO SPACECRAFT ESCAPE SYSTEM

The National Aeronautics and Space Administration will conduct the first off-the-pad abort test involving the Apollo spacecraft launch escape system no earlier than Nov. 7 at the White Sands Missile Range, New Mexico.

NASA's Manned Spacecraft Center, Houston, is conducting the test.

An engineering test vehicle that duplicates the size and weight of the three-man command module of the Apollo spacecraft will be used. It will lift off a concrete pad powered by the Apollo launch escape motor mounted on a launch escape tower attached to the module.

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Purpose of the test is to determine the stability and operational characteristics of the escape configuration during a pad abort. The test vehicle is identified as Boilerplate No. 6.

Manned Spacecraft Center engineers say the pad-abort test is developmental in nature. The engineers have only wind tunnel data on which to predict the sequence of events in the test and they must extrapolate the wind tunnel data to actual flight dynamics. This is the first rocket-powered test of this particular spacecraft-tower configuration.

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TEST OBJECTIVES

This mission has the following test objectives:

1. First-order objectives:

   a. Determine aerodynamic stability characteristics of the Apollo configuration during a pad abort.

   b. Investigate the capability of the escape system to propel a command module to a safe distance from a launch vehicle during a pad abort.

   c. Investigate proper operation of the launch escape tower release mechanism.

   d. Investigate proper operation of the tower jettison motor.

   e. Investigate proper operation of the parachute recovery system.

2. Second-order test objectives:

   a. Investigate satisfactory abort and recovery timing sequence.

   b. Determine spacecraft dynamics during jettisoning of the escape tower.

   c. Investigate the operation of research and development instruments and communications equipment to be used on subsequent flights.

   d. Investigate compatibility of prototype ground support equipment.

   e. Determine initial separation trajectory of the launch escape tower.

   f. Determine escape tower vibration during a pad abort.

GENERAL FLIGHT PLAN

The test vehicle will be launched vertically from the White Sands Missile Range, an area about 4,000 feet above sea level. A ground command abort signal will activate the abort sequencer in the command module. Plans call for the test to proceed on the following timetable:

T to T plus 8 seconds -	Launch escape and pitch control motors ignite, escape motor burns eight seconds, vehicle attains altitude of 4,100 feet above ground level at burnout. Vehicle continues upward on ballistic trajectory.
T plus 15.5 seconds -	Jettison motor ignites and launch escape tower releases at 4,900 feet. Escape tower and motor and apex heat shield fall to earth in free trajectory.
T plus 18.5 seconds -	Drogue chute deploys at 4,700 feet, assisting in orienting blunt end of command module forward for main chute deployment.
T plus 23.5 seconds -	Drogue chute releases, pilot parachutes deploy and extract three main chutes at 4,150 feet.
T plus 27.5 seconds -	Main parachutes at line stretch condition at 3,400 feet.

T plus 29.5 seconds - Main chutes inflated in reefed condition at 3,200 feet.

T plus 33.5 seconds - Main chutes disreefed at 3,000 feet.

T plus 37.5 seconds - Main chutes fully inflated at 2,800 feet. Equilibrium descent of approximately 24 feet per second established.

TEST VEHICLE COMPONENTS AND CHARACTERISTICS

Weight of test vehicle is approximately 15,800 pounds. A breakdown and description of the major components of the test vehicle is as follows.

COMMAND MODULE - The Command Module is of conical design approximately 134 inches high and 154 inches in diameter at the base, with a nominal weight of 9,000 pounds. It is constructed of aluminum alloy.

The apex heat shield or forward compartment cover forms the forward section of the outer structure and protects the parachute subsystem.

The main hatch provides access to the Command Module interior. The hatch is constructed of reinforced aluminum plate and is bolted into place. It is located on the Command Module sidewall over the head of the center couch position.

The simulated aft heat shield consists of a sandwich type construction with aluminum alloy inner and outer skins separated by resin-impregnated glass laminations.

The earth landing system consists of pyrotechnics and pyrotechnically-actuated devices, one conical ribbon drogue parachute, three ring-sail main parachutes, deployment bags, bridles, three pilot parachutes, risers, an impact switch,

and a sequence controller. The drogue parachute is 13.7 feet in diameter and is deployed by a mortar. The main parachutes are 88.1 feet in diameter and are deployed by three mortar-deployed pilot parachutes which extract the three main parachutes from their deployment bags.

LAUNCH ESCAPE SYSTEM

The launch escape tower is a truncated rectangular pyramid constructed of welded tubular titanium alloy. It is approximately 120 inches long with the base measuring 46 by 50 inches. The tower forms the intermediate structure between the Command Module and the Escape and tower jettison motors.

The Launch Escape motor is a solid propellant motor with four nozzles canted 35 degrees. The motor weighs approximately 4764 pounds of which approximately 3200 pounds is fuel. The average thrust developed is approximately 155,000 pounds.

The Pitch Control motor is a solid propellant reaction motor which provides 3400 pounds of thrust for one half second in a direction perpendicular to the vehicle center line. This produces the required lateral displacement from the pad to insure crew safety.

The tower jettison motor propels the expended launch escape system away from the Command Module to preclude interference with the operation of the earth landing system. The tower jettison motor develops 33,000 pounds of thrust for one second and weighs approximately 540 pounds.

The tower release mechanism consists of four explosive bolts. Each bolt contains a single explosive charge and employs a dual ignition feature to increase reliability. Positive release is assured when either one or both of the initiators is fired.

GROUND ADAPTER - The ground adapter structure is a truncated hexagonal pyramid approximately 200 inches in diameter at the base and 48 inches high. The adapter, which simulates the launch vehicle interface with the Command Module, is leveled in the horizontal plane and is mechanically attached to the concrete launch pad.

SUPPORT - Photographic support is required from launch through impact, for determination of position, acceleration, velocity, and attitude data. It will also supply data to fill requirements for engineering sequential and documentary films.

Meteorological support requirements include wind direction and velocity, air density, temperature, relative humidity up to altitudes of 10,000 feet and is supplied by the White Sands Missile Range. General forecasts are also required to support scheduling of the launch.

RECOVERY REQUIREMENTS - Recovery of the tape recorded data immediately after impact is considered the primary requirement. The entire launch vehicle is to be recovered including the Command Module, the recovery parachutes, forward compartment cover and the entire Launch Escape System for post flight analysis.

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